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ECONOMIC POLICY, ORGANIZATION, AND MANAGEMENT

VALOVOY DISCUSSES NET OUTPUT, COST ACCOUNTING

Advantages of Net Output Indicator

Moscow PRAVDA in Russian 24 Mar 80 p 2

[Article by Dmitriy Valovoy: "Net Output"]

> [Text] Net output, normative net output--in recent years these terms have been encountered with increasing frequency in the press and over radio and television. Net output has been a subject of discussion at numerous conferences and symposiums and meetings of collegiums and committees. It has had quite a few proponents, but there have also been opponents. Experience has decided the drawn-out dispute. An experiment has confirmed that this indicator has a number of virtues. That is why under the decree on the economic mechanism adopted last year by the CPSU Central Committee and USSR Council of Ministers net output is becoming the principal value indicator in many sectors of the economy. There is a great deal of scientific and organizational and technical work to be done in this connection at all levels of administration. What does this new indicator represent? What are its advantages over other indicators?

"Impure" as Opposed to Net Output

Last year fulfillment of the plan for dump trucks at the Mytishchi Machine-building Plant was 100.6 percent, for subway cars it was 91.7 percent, and for the products of machine tool building it was 40 percent. How is one to evaluate this performance as a whole? In a system in which commodity-money relations are used, value (money) indicators are used for this purpose.

For a long time the principal value indicator was gross output (commonly referred to as "val"). It includes all costs related to the production and sale of products. By decision of the September (1965) Plenum of the CPSU Central Committee it was replaced by the indicator referred to as volume of products sold (sales). Many years of experience have shown that this substitution is no longer yielding the desired results. Why?

It seems to us the main reason is that the wage fund and the growth rates of the volume of production and labor productivity are still determined on the basis of gross output. Moreover, sales as an indicator has retained the principal defect of gross output: the more expensive the product, the better it is for plan fulfillment and the wage fund. Gross output, commodity output and sales are like sisters at different ages. At the Mytishchi Machinebuilding Plant in 1979 they stood at 276, 272 and 271, respectively, while net output was only 40 million rubles.

What is this net output? This is the value newly produced (wages plus profit) by the enterprise's work force. In accordance with Marxist theory it is created only by live labor, and the results of embodied labor merely pass on their value to the product manufactured. The term "net," or pure, is very much a convention. The idea is that by contrast with "impure" output (gross output, commodity output and sales), net output has been "purified" to eliminate the labor of others, which is embodied in material costs (raw materials, intermediate products, fuel, and so on). In the socialist countries net output is referred to in various ways--"own labor," "added value." But the essence of this indicator is the same everywhere: it is a question of the given collective's own contribution (labor) to the product they produce.

To determine net output we must subtract material costs from gross output. But it is not feasible to apply it to assessment of enterprise performance. Why? First, speed of response is lost, since the computation can be made only in the middle of the following month; second, it reflects the individual expenditures of the collective in question, and they are not comparable in dynamic terms.

That is why it was decided in the light of the experiments which have been conducted in various sectors to use normative net output, which can be determined on a daily basis with much greater ease. It is computed on the basis of net output standards, which are not actual costs, but standard costs. These standards are adopted for all types of products (jobs) along with the setting of wholesale prices, and they are set by the same authorities.

Wage expenditures are computed for the standards on the basis of average progressive levels of labor intensiveness in the sector or industry. And profit? Net output in the production of bulldozers, for example, is 1,195 rubles, including only 84 rubles of worker wages. As we see, net output turned out to contain "impurities," since profit was determined on the basis of all costs, while the value of the bulldozer is 18,000 rubles, of which the price of the T-130 tractor represents 16,000 rubles. As a result past labor has "created" a 14-fold larger new value than has live labor. This is theoretically incorrect, and in practice it has an adverse effect on the commitment and motivation of the collective as to its own work (contribution). That is why it was decided to apply the rate of profitability to the production cost without material costs, which helps to "purify" net output, eliminating the labor of others.

Own Labor

Failure to fulfill the assignment for subway cars and other types of products did not hinder the Mytishchi Machinebuilding Plant from fulfilling its sales plan at 100.5 and its plan for the rise of labor productivity at 102.1 percent. This occurred because of overfulfillment by half a percentage point of the assignment for dump trucks, whose attraction to the workers in Mytishchi is understandable and explainable.

It was assumed that the plant as a whole would spend 8 kopecks of wages for every ruble of gross output. Every output-hour expended in the manufacture of dump trucks yields it 104 rubles of "impure" output for the plan and 9 rubles for the wage fund, while in the production of railroad cars the results are 9 rubles for the plan and 72 kopecks of wages. These figures are only half as high in the manufacture of the products of machinebuilding as they are for railroad cars. At the same time wage expenditures are approximately the same everywhere--2-2.3 rubles per output-hour. In other words, the actual expenditure for wages on railroad cars is threefold higher than planned, and for the products of machinebuilding it is sixfold more than planned. In our opinion this is the root cause of the division of output into profitable and unprofitable products.

The transition to net output eliminates this kind of unfairness. The decree on the economic mechanism proposed that enterprises be assigned standard wages per ruble of normative net output. In this way earnings will be actually earned. The situation is more complicated in this respect in the construction industry, where the transition to net output is supposed to begin only at the end of the next 5-year plan.

In the 11th Five-Year Plan the volume of commodity output of construction in money terms, a new indicator, is being introduced to evaluate organizations operating as contractors. In its economic content it corresponds to the sales indicator in the industrial sector. For that reason recommendations for computing the wage fund on the basis of this indicator do not from a theoretical standpoint have the required foundation. This is also confirmed by the results of experimental verification. Summing up the results for 1979 in operation under the new system, I. Mozolyako, Belorussian minister of industrial construction, said: "The experience of issuing funds for wages as a function of fulfillment of the plan for the commodity output of construction has not justified itself."

In the system of the Ministry of Construction, for example, the relative share of wages was set at 20-25 percent of gross output for construction contractors (in construction it is referred to as the volume of work done by "own" resources). But on the basis of estimates and unit costs labor costs in assembly of reinforced-concrete and metal fabrications is 5-10 percent, while in plastering and painting it is 80-90 percent. From project to project labor costs as a whole vary from 15 percent to 50 percent or more. For instance, last year they were 54 percent for the work Glavmospromstroy did on the Olympic projects. Reconstruction is particularly labor-intensive.

In order to ensure average wages on projects near completion and on reconstruction work the builders were compelled to manufacture "dump trucks," that is, to perform first the profitable operations on the new projects. But as the number of unfinished projects increases and the relative share of reconstruction rises in the total volume of construction and installation work, the possibilities of this kind of "way out" of the situation are becoming increasingly limited.

That is why in determining and stimulating the builders' own labor on projects it is advisable on the one hand, insofar as possible, to speed up the transition of contractors to net output, and on the other to determine the real wage fund on the basis of the project plans and estimates, as has been envisaged by the decree, to plan material resources rather than to allocate them as "so much per million," that is, as the average per million rubles of construction and installation work.

This decision, it seems to us, will considerably eliminate the objective motivation of builders to begin more and more new projects in order to "make ends meet" with wages and thereby will have a substantial impact toward speeding up delivery of projects and reduction of above-allowance unfinished production, which in spite of the steps which have been taken is still continuing to grow. And probably the decisive role is played here by the fact that the wage fund is directly dependent on the volume of "impure" output, which is what makes some projects unprofitable.

Final Results

"If we take our entire industrial sector as a whole," F. E. Dzerzhinskiy, chairman of the USSR All-Russian Council of the National Economy, said at the plenum of the Russian Communist Party (Bolshevik) Central Committee in 1924, "and calculate the entire gross output, adding in the output of each industry, adding in the fuel extracted, the ore, the pig iron and other industrial raw materials along with the finished product--such as machines, steam locomotives, fabrics, boots, and so on--and divide this gross output thus obtained by the number of participants and arrive at the average productivity of labor per person, then we would altogether lose sight of our uneconomical and downright rapacious attitude toward raw materials, fuel and supplies. But our calculations show that the more we waste, the greater is our output and the higher our productivity."

In a note to A. M. Ginzburg Feliks Edmundovich proposed that the concept of net output be included in the report on labor productivity, "meaning that productivity which is the result going on to actual consumption."

The purpose of socialist production is the fullest satisfaction of the needs of the workers at the smallest cost. The principal way of accomplishing this is to raise labor productivity; that is, when, in the words of K. Marx, "a smaller amount of labor acquires the ability to produce a larger amount of use value." But the reverse holds when labor productivity is defined on the basis of gross (commodity) output: the larger the expenditures of live and past labor, regardless of use value, the higher this indicator will be.

A centrifugal multirotor machine produces 45 pieces of cast-iron pipe per hour. But their diameter may be 50 or 100 mm. The former will weigh 500 kg, and the latter 1,130 kg. The volume of "impure" output will be 70 and 132 rubles, respectively. While the labor expenditures are the same in both cases, in the latter case labor productivity will be nearly twice as high according to the previous method of recording. It is obviously for that very reason that at the Voronezh Machinebuilding Plant on only three models of machine tools checked by people's inspectors the increase in weight was 5 tons over the draft plan.

It is quite understandable, then, that certain heads of ministries would want to retain the previous indicators, since they would allow enterprises the possibilities at times of fulfilling the plan by increasing the relative share of purchased products and of applying more expensive materials. The producers in turn have striven to manufacture pipes, conductors, large-size rolled products, which has naturally resulted in a shortage of the small sizes. And what is the situation with consumers? Because of the shortage of small sizes, they have used "what was given them." The resulting increase in the cost of facilities and products help them to fulfill the plan in rubles and to "raise" labor productivity.

The guidelines on methods of applying normative net output state that this indicator is used to determine the dynamic behavior (growth rates) of the physical volume of production and labor productivity, to plan the wage fund and to monitor its use. This fundamental change in the economic mechanism has tremendous importance to objective determination and motivation of the collective's own contribution to the final output. Under such conditions the pursuit of "dump trucks" will not only be nonsensical, it will be too expensive.

Normative net output promotes more optimum combination of the interests of society with those of the collective. It makes it possible to be more thrifty in using material and labor resources. In the Ministry of Power Machinebuilding, for example, where normative output has been used as an indicator at all enterprises, expenditures for raw materials and supplies dropped from 31.8 to 29.4 kopecks per ruble of commodity output over the last 2 years, though these expenditures are rising in the industrial sector as a whole. Adoption of the new indicator is an important step in orienting production entities toward attainment of high final results.

"In the seventies," L. I. Brezhnev said in a recent speech to inventors, "we began the change of direction of our entire economy toward intensive development, higher efficiency and quality, and emphasis on the final results of economic activity. In the eighties we must continue and complete this very important work, which is the backbone of the party's economic strategy."

The New Potential of Khozraschet

Moscow ZHURNALIST in Russian No 2, Feb 80 pp 38-41

[Article by Dmitriy Valovoy, doctor of economic sciences: "Reinforcing and Broadening Khozraschet Relations"]

[Text] Since the 1965 economic reform cost-accounting (khozraschet) methods have extended far beyond the premises of enterprises: "upward," "downward" and horizontally. The principles of cost accounting are being used to structure the activity of production and scientific-production associations, of republic and all-union industrial associations, and of a number of republic and union ministries. Cost-accounting methods are now being widely used in shops, sections and work crews. They are being used on an experimental basis in scientific-design and project-planning institutes and scientific institutions. Cost-accounting relations of production collectives with organizations in the trade sector and transportation are being strengthened.

The experience which has been gained convincingly confirms that expansion and reinforcement of cost-accounting relations offer a sound basis for improving the economic efficiency of social production. The final section of the decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Improving Planning and Increasing the Influence of the Economic Mechanism on Production Efficiency and the Quality of Performance" is devoted to this problem. This section is called "On Development of Cost Accounting and Strengthening the Role of Economic Levers and Incentives." It is this that we will be discussing.

The series of measures to further strengthen cost-accounting relations have pursued a single goal--improving the final results of activity of production collectives and more optimum combination of the interests of society and the interests of collectives. One of the most important measures outlined by the decree is this: evaluate the results of the work of associations and enterprises and base their material incentives on fulfillment of plans for delivery of products according to the specified list and assortment within the agreed period, for raising labor productivity, for improving quality and for increasing profit. The decree calls for completion over the next 2 or 3 years of the formation of production associations as the principal cost-accounting entity in industry, for performance of measures toward industrial specialization and cooperation, and for centralizing auxiliary and subsidiary services and also the managerial functions of associations, enterprises and organizations.

Great importance in strengthening cost-accounting relations is being given to enhancement of the role of economic incentive funds. In recent years, as we know, economic incentive funds have been formed in enterprises and associations: the material incentive fund, the fund for social welfare and cultural programs and housing construction, and the production development fund. They have become a powerful stimulator of the growth of production and of higher product quality. It is sufficient to say that in 1965 the economic incentive funds of enterprises and economic organizations amounted to 2,559 million rubles, while in 1978 this amount was 23,742 million rubles solely on the basis of funds formed as part of adoption of the new procedure for planning and economic incentives, while the total--including the previous bonus funds--was 27,936 million rubles.

But the principle of transfers to funds is in need of further improvement, since it is not firmly linked to the final results of the economic activity of production units and product quality. Moreover, the present rates of the transfers to funds are very unstable, and sometimes they change several times a year. In some places the rates are determined by the "average ceiling" method, that is, they are adapted to the situation as it actually comes about. This takes away from production collectives the conviction that the better they work, the more they will receive. And conversely, those who are performing poorly hope that at someone's expense they will be thrown the funds for their 13th paycheck: either the plan will be reduced, or the rate of the transfers will be raised at the expense of those building up substantial funds.

In order to make economic incentives more effective the decree of the CPSU Central Committee and USSR Council of Ministers recommended that the transition be made in the 11th Five-Year Plan to the formation of the material incentive fund, the fund for social welfare and cultural programs and housing construction, and the production development fund at rates that would remain stable throughout the 5-year period. The rate could be raised for enterprises increasing their output of a highly efficient new product--either an industrial product or a consumer product. Higher rates will also be assigned when production collectives adopt counterplans that exceed the 5-year assignment for the coming year. At the same time if an economic organization has not fulfilled the assignment of the 5-year plan for the indicators used to regulate funds, then the transfers to economic incentive funds are made at correspondingly lower rates.

Which indicator should be used for setting the rates--the transfers to economic incentive funds; on what sort of factors will the total amount of those funds depend?

Provision has been made for the material incentive fund to be formed as a function of the rise of labor productivity, the growth of output of products in the superior-quality category, and fulfillment of the plan for delivery of products to consumers in accordance with contracts concluded. The rates are to be set in percentages of profit, and in certain industries--in percentages of the wage fund of the base year of the 5-year period. It is very important that the rates based on the growth of production will be determined per unit of output in physical terms. Depending on the specific nature of the sector or industry, the formation of this fund will be affected by such qualitative indicators as the saving on physical resources, the rise of the output-capital ratio and the shift coefficient, the level of profitability, the rate of reduction of production cost, and--in the extractive industries--the growth of output in physical terms. It has been recommended that bonus funds be committed mostly to stimulating qualitative indicators and to performing obligations under business contracts, the results of socialist competition also being taken into account. It is important that the bonuses of personnel of all-union and republic industrial associations will also be made dependent on these indicators.

The funds for social welfare and cultural programs and housing construction is to be built up in the proportion of 30-50 percent of the material incentive fund. Within those limits ministries can differentiate the rates of transfers to this fund of their subordinate associations and enterprises as a function of the adequacy of housing and cultural- and consumer-service institutions of production collectives. Moreover, a portion of the resources of the material incentive fund may also be used for housing construction and social welfare and cultural programs depending on the collective's needs.

It is recommended that the production development fund be built up on the basis of rates of transfers from profit and depreciation deductions intended for complete replacement of fixed capital. Proceeds from the sale of superfluous equipment which has been retired would also go into that fund.

The purposes and directions in use of economic incentive funds should be determined by the administration of economic organizations jointly with the trade union committee. Production collectives would take an active part in this work. The resources of economic incentive funds must be used strictly for the intended purpose. Unused remainders would be carried over to the next year and would not be subject to confiscation.

The important role of providing enterprises and construction sites all the resources they need punctually and fully has already been noted in ZHURNALIST. It is very urgent in this connection to improve the operation of supply agencies, to make them more accountable for fulfillment of their obligations. The principal criterion for evaluation of the activity of material and technical supply agencies and the principal indicators for the awarding of bonuses to the personnel of those agencies should be fulfillment of business contracts and plans for delivery of products. To that end the transition of material and technical supply agencies of USSR Gossnab to cost accounting is to be completed this year. Their relations with production collectives must be built up on the basis of business contracts and mutual financial liability. Provision has also been made to increase the material liability of transportation organizations for nonfulfillment of the agreed shipment plans. Moreover, it has been proposed that USSR Gossnab complete in 1981 the transition of construction sites included on the state plan for capital construction to aggregate supply of physical resources in accordance with the need as stated in project plans and estimates.

The decree calls for ministries and departments, with the involvement of USSR Gossnab, to draft and approve a list of products to be produced and delivered by enterprises and associations so as to take into account their specialization, beginning in 1980. This document should become the basis for conclusion of contracts with consumers and supply and sales organizations for delivery of products needed within the limits of funds allocated.

Jointly with interested departments USSR Gossnab has been order to complete this year the transition of enterprises and associations to direct long-term business relations. At the present time business contracts are renewed annually. This increases the amount of administrative work that has to be done in the economy, since many associations have relations with thousands of suppliers and customers. The season for contract renewal lasts several months and, of course, disrupts the smooth pace of operation. The decree states that under the conditions of direct long-term relations among production enterprises (associations) as well as between enterprises and supply and transportation organizations and depots of state and cooperative trade the contracts should be concluded for a 5-year period. There are plans to introduce more widely progressive forms of supply and above all to develop guaranteed aggregate supply of material resources to enterprises and associations on the basis of contracts concluded.

At present economic incentives are oriented to a considerable extent toward the quantity of goods produced. Incentives do little at present to encourage quality and renewal of assortment. Enterprises producing highly efficient new products not uncommonly fall into a difficult financial situation. The reason is that improvement of quality ordinarily requires additional outlays of labor and materials, but the wholesale price on products of this kind is uniform. Not uncommonly the costs result in a loss for the enterprise and are paid out of its pocket.

The decree outlines a number of important steps to improve incentives for the manufacture of highly efficient new products. To that end it proposes completion in 1980 of the transition of scientific-research and project-planning-and-design associations, scientific-production and production associations, enterprises and industrial ministries to the cost-accounting system of organizing efforts to create, put into production and apply new technology on the basis of contracts and job orders. In order to eliminate the tendency to use expensive materials and increase the materials intensiveness of products, the volume of costs for scientific and design and production engineering efforts are to be determined in percentages of normative net output.

So that the assortment of products is regularly renewed, an incentive premium added to the wholesale price is being introduced for highly efficient new products. At the same time a deduction in the amount of 50 percent of profit obtained is to be applied to the wholesale price of products classified in the second-quality category which have not been certified by a certain date. At the end of the period for withdrawal of a second-category product from production, the deduction applied to the wholesale price amounts to the full amount of profit.

It is well known that in the 11th Five-Year Plan the demographic situation is deteriorating noticeably [sic]. That is why a more rational utilization of manpower resources is becoming particularly urgent. There is unutilized potential here. Nor is it small. It principally lies in the areas of speeding up the growth of labor productivity and reducing manual labor and personnel turnover.

How is this achieved? The dependence of the earnings of every worker and of the collective as a whole on raising labor productivity and on improving the final results of the operation of associations and enterprises needs to be strengthened. To that end enterprises are being extended the right to use a saving on the wage fund to pay premiums applied to wage rates and salaries. To be specific, up to 50 percent of the wage rate or salary to workers for combining occupations and performing the same amount of work with a smaller labor force, up to 30 percent to engineering and technical personnel and employees for high qualifications, and up to 50 percent of salaries to designers and process engineers. But these premiums are discontinued if performance indicators deteriorate. If a collective has a saving on the wage fund at the end of the year, provided the plan for production and the rise of labor productivity is fulfilled, that saving is credited to the material incentive fund, and if there is an overexpenditure for wages, this is covered from the material incentive fund.

It is well known that in recent years the brigade method of organizing and stimulating labor has been used very widely. It originally began to be used in construction, and then it was given a permanent place in many industries. This is not a fundamentally new form of organization of work. But substantial changes have taken place in it in recent years. Previously many enterprises were manufacturing too broad a list of products in a diverse assortment. In order to raise labor productivity industrial specialization had to be speeded up. That is why specialization was a mandatory condition for construction of new enterprises. It has also been vigorously pursued at old factories and plants.

In this context specialized brigade became widespread. On the whole they have justified themselves. But even specialization has its rational limits. And it seems that in some places they were exceeded. This had an adverse effect on the final results of performance. In recent years, then, combined-skill work teams began to be created in various sectors and industries. They would include workers from different specialties necessary to do all the jobs in a particular section of the manufacturing process. These work teams work under a single order, that is, the assignment is broken down to the work team as a whole on the basis of the size of the final output and the quality of the end product. Aside from the basic wage applicable to this product, the team as a whole is credited bonuses for reduction of labor intensiveness and production cost, for saving on materials and electric power, and for other qualitative indicators.

How are the earnings distributed? The basic wages distributed in proportion to each worker's rating and the time he has worked, while the various forms of additional earnings and bonuses are ordinarily distributed according to the work-participation coefficient of the members of the work team. The assembly or council of the work team evaluate the work contribution of every member to the overall result, and they take into account the worker's attitude toward his job, how complicated and difficult his work is, and his combination of occupations. An important indicator affecting that coefficient is also adherence to work discipline and production discipline.

In order to take advantage of the experience that has been built up, there are plans to make this progressive form of work incentive the principal form in the 11th Five-Year Plan. Work teams or their councils are being given the right up to the limits of the funds allocated them to determine the size of bonuses and the earnings of every member of the team so as to take into account his actual contribution to the overall result.

Increasing economic accountability of all economic entities--from the enterprise to the ministry, and strengthening their motivation to use material and financial resources with the highest efficiency are very relevant to strengthening cost-accounting relations. To that end the decree proposes reduction of the list of assets on which no charge is paid. The rates of the charge on productive capital is ordinarily set at 6 percent. It is important to emphasize in this connection that charges on above-allowance inventories and equipment not installed, if they have not been financed with credit, are not to be included in the costs of production as expenditures incurred in the production process, but are to be deducted from the profit left to enterprises. And if the production plan and assignment for profit are fulfilled with a smaller value of capital than the standard, the saving on the charge for capital is left at the disposition of the enterprise.

The Soviet Union is rich in land and water resources, but they are not limitless. Quite a few critical articles have been published in the press on misuse of water for technical purposes. But this had no impact whatsoever on the economics of the enterprise. Nor are other cases uncommon in which plowland is set aside for a construction site, while alongside there are plots of worthless land unsuitable for cultivation. The decree calls for the charge for water taken by industrial enterprises from water supply systems to be included in the production cost, and the cost of plots of land to be set aside is to be taken into account in the feasibility study for construction of enterprises.

In order to increase the motivation of production collectives to improve their financial results, 50 percent of above-plan profit will be left to the disposition of ministries (associations, enterprises). Should the profit plan be overfulfilled by more than 3 percent, another 25 percent of that overfulfillment is left to the disposition of the collective.

The principle that wholesale prices in the industrial sector, estimate norms in capital construction and freight rates remain stable throughout the 5-year period also has fundamental importance. The reason is that reduction of product costs and construction costs has not only had an adverse effect on economic indicators, but has also resulted in an artificial reduction of the growth rates of production and labor productivity, which are determined on the basis of gross output. We will demonstrate this with an example.

The Melitopol' Compressor Plant at some time in the past substituted capron rings for cast-iron rings. The service life of these parts increased from 3,000 hours to 13,000. The price of the cast-iron rings was 2 rubles 20 kopecks, and that of the capron rings 27 kopecks. The plan called for 500,000 such rings. This is a loss of 1 million rubles--both for gross output and for the level of labor productivity. Another example. One of the pipe plants put into production new higher-quality pipes, but they were considerably more lightweight than the previous ones, and that made them cheaper. As a result the gross output dropped 7 percent, and labor productivity dropped 15 percent. Cases like this have been observed at many enterprises.

According to data of the USSR Central Statistical Administration, in 1978 a saving of about 3 billion rubles was achieved through reduction of expenditures of raw materials, supplies, fuel and other subjects of labor. This is more than 10 percent of the annual growth of industrial output. Yet a sizable share of this amount proves to be a loss to the gross output, and consequently a loss in terms of the growth rates of production and labor productivity. It is quite understandable that business executives are cautious in approaching introduction of a new product which is cheaper than the previous one. They must be concerned in advance about reimbursing the losses by making some other product more expensive. Now this situation is altered fundamentally.

When cheaper materials than those previously used are used in production and the quality of a product is maintained, the wholesale prices will remain unchanged to the end of the 5-year period. Wholesale prices on new products with lower materials intensiveness are to be set so as to take into account retention of the proportion of profit obtained from selling the product previously produced, but not to fall below the standard level of profitability. As for determination of the volume of production and labor productivity, wholesale prices for the previous (replaced) products will be used until the end of the 5-year period.

This approach to determining the growth rates of production creates conditions favorable to an all-out effort to save on material resources and opens up room for reduction of the material intensiveness of machines and other types of products. Under the new conditions replacement of the cast-iron rings with capron rings would yield 1 million rubles of net profit annually and would not have an adverse effect on the growth rates of production and labor productivity.

The decree attributes great importance to further improvement of the organizational structure of management of the national economy. Under a decision of the September (1965) Plenum of the CPSU Central Committee, the regional system of management of social production--through sovnarkhozes--was replaced by the sectoral system. Union, union-republic and republic ministries and departments were created, considerable work was done to improve their structure, and the number of tiers was reduced. About 3 dozen general management schemes were introduced in the industrial sector calling mainly for a two- or three-tier management structure and formation of approximately 4,000 large production and scientific-production associations.

In the process of improving the management system ministries have at times looked above all to their narrow departmental interests and have done little to take into account interdepartmental needs. This sets a limit on the possibilities for specialization and concentration of production and gives rise to parallelism. In spite of the important advantages of agro-industrial and scientific-production associations, they are developing slowly. The opposed interests of different departments are the principal obstacle. No one wants to transfer "his own" enterprises and organizations into "someone else's" departments.

In order to eliminate these adverse phenomena in management of the economy the decree calls for recommendations to be drafted that would further improve the organizational structure, would overcome opposition of departmental interests, and would improve regional management and organizational forms for carrying out special-purpose programs, and recommendations would also be drafted concerning enhancement of the role of Soviets of People's Deputies in economic construction and expansion of the rights of work collectives.

In conclusion I would like to emphasize the following. Adoption of the decree on the economic mechanism is creating the most favorable opportunities for increasing the economic efficiency of production. But possibility and reality are by no means identical concepts. Realization of possibilities necessitates strenuous work, and this has been noted at the November (1979) Plenum of the CPSU Central Committee.

Experience in introducing the new indicators, instruments and methods of economic activity should have a worthy place in the pages of our press.

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ECONOMIC MODELING AND COMPUTER TECHNOLOGY APPLICATION

BETTER EQUIPMENT FOR USSR CSA COMPUTER NETWORK PLANNED

Moscow VESTNIK STATISTIKI in Russian No 2, Feb 80 pp 55-59

[Article by M. Lermontov, S. Tiokhin and L. Khatskevich, Moscow: "Certain Aspects of Improving Management of Material and Technical Supply to the USSR CSA Computer Network"]

[Text] The USSR CSA [Central Statistical Administration] computer network is structured to conform to political administrative divisions and has four levels: union, republic, oblast (kray and ASSR), and rayon (city). It embraces about 2,900 computer organizations equipped with various types of computers, equipment for data preparation and transmission, printing equipment, equipment for copying and reproduction, motor vehicles, and so on.

The USSR CSA computer network is one of the largest intersector information and computer systems in the country. It performs operations for more than 93,000 enterprises and organizations in various sectors of the economy. Consequently, increasing the operational efficiency of this computer network has great importance not only to the government statistical system, but also to the country's economy as a whole.

In order to perform these important tasks the computerized system for management of the computer network (ASU VS) has been created in the CSA system. The scientific research institutes of the USSR CSA, jointly with the Main Administration of Computer Operations [GUVR] of the USSR CSA, have now drafted the technical assignment for creating the computerized system for management of the computer network of the USSR CSA; this assignment contains definition of the purpose of setting it up, its configuration, the principal requirements of the functional and supporting subsystems, the organization of efforts, and stages in the project planning and introduction. This system is to be set up as a unified and integrated information and management system, ensuring the most efficient management of processes in the operation and development of the USSR CSA computer network. The main lines of the efforts to set up the system will be to improve the structure and organization of the process of management of the USSR CSA computer network and full automation of the processes of data gathering, transmission and processing. The configuration of the ASU VS will call for development of several levels: the ASU GUVR of the USSR CSA, the republic level--the ASU GUVR (republic computer center) of the union republic's CSA, and the oblast level--the ASU of the computer center.

The functional structure of the ASU VS, in accordance with intersector materials on methods and the specific nature of the computer network's operations will include 13 subsystems encompassing all aspects of the operational activity of the GUVR of the USSR CSA, including management of capital construction and material and technical supply.

The functional subsystems will be developed to provide for adherence to the principle of methodological unity of all subsystems, multipurpose use of the data and interaction based on the systemwide data base of the ASU VS.

A standardized documentation system, a system of comparable technical-and-economic indicators (planning and economic, bookkeeping and financial, value, recordkeeping and statistical, etc.) describing the state and results of the VS's operation, tools for formalized data description, classification and coding, etc., will be the basis for developing the information support of the ASU VS.

The systemwide software [OSPO] of the ASU VS is to ensure functional integration of the information and computer capabilities and is being developed to provide for maximum use of software in the framework of the ASGS [computerized government statistical system]. The combined data processing and computing capability of the ASU VS will be built on the basis of the present technical base of the government statistical system, providing as well for its development, and it will ensure automatic technology for the gathering, transmission, storage, processing and exchange of data between levels of the system, remote user access to the information resources of the computer center's data banks, the capability of responsive delivery of reference-information data by means of visual display terminals, etc. It is anticipated that this system will be created in all its aspects over the next few years.

But the real conditions that obtain in the system of material and technical supply of the GUVR of the USSR CSA urgently call for a faster pace in the process of introduction of automation in the sphere of management of material and technical supply.

Material and technical supply [MTS] of computer organizations of the USSR CSA, which is done by GUVR of the USSR CSA, is now becoming one of the principal factors in the operational process. For instance, in 1979 the volume of capital investments merely to acquire computers and diverse equipment increased 2.4-fold over 1972. Thus improvement of management of material and technical supply of the USSR CSA computer network is an urgent need and an indispensable condition for improving the operational efficiency of the computer system. Successful performance of the tasks confronting the GUVR of the USSR CSA is possible only if computer organizations have punctual and uninterrupted supply of all types of physical resources.

The quantitative growth and reequipping of computer organizations with up-to-date computers are posing qualitatively new tasks for the relevant subdivisions of CUVR of the USSR CSA performing the functions of management of material and technical supply.

Measures to improve organization of material and technical supply of the USSR CSA computer network have already been drafted, and are now being implemented, and more thorough monitoring of fixed capital for equipment and supplies has been instituted. Many types of materials and equipment (the most important items) are sent directly from supplier plants to republic and oblast computer centers. This reduces delivery time of materials to consumers, and plans covering the needs of the system of the USSR CSA for computers and copying equipment, data carriers, miscellaneous materials, and so on, are now being compiled more competently.

In order to improve quality in planning the needs for computers, equipment, materials and replacement parts it would be wise to improve further the records kept on the following:

i. the makeup of computers and accompanying equipment at all computer centers and MSS [computer and calculating stations], the length of its service and the level of the load on it;

ii. space available or being made available for computer centers and MSS and possibilities for making facilities more compact;

iii. makeup (configuration) of equipment (maximum possible and minimum permissible) for each computer center and MSS;

iv. permissible alternatives in substitution of equipment;

v. list of computers, accompanying equipment, replacement parts and materials manufactured;

vi. prospects for increasing the volume of data processed, and so on.

Resources to be distributed among computer centers and stations in the system of the USSR CSA should be planned so as to take into account the equipment already there. In order to improve the quality of distribution of these resources it would be wise to work out a system for ranking users with respect to some criterion of importance so that a sound order of priority is established in furnishing these resources.

Order should be established in the keeping of records on physical resources in specialized warehouses of the computer system of the USSR CSA once the necessary conditions have been created for this.

And finally, there is a need for more clear-cut definition of the functions of the GUVR's of the USSR CSA and the central statistical administrations of the union republics with respect to material and technical supply of computer stations and MSS at the oblast and rayon levels. It would seem wise to leave to the GUVR of the USSR CSA the functions of planning the needs and distributing the material resources at the level of the union republics, while the functions of planning and distribution at the level of the autonomous republics, krays and oblasts would be assigned to the GUVR's of the union republics.

But an effective solution to the problem of improving the organization of management of material and technical supply in the system of the GUVR of the USSR CSA is possible only on the basis of automation and widespread introduction of the most recent advances in the field of computers, data recording and transmission equipment and the methods of mathematical economics.

Because these processes are highly dynamic, with the present methods and means of fulfilling the tasks of material and technical supply the GUVR of the USSR CSA is unable to fully accomplish the following: regular recordkeeping and monitoring of the consumption of materials and replacement parts; systematic monitoring of the arrival of material resources from suppliers; computations of sound multiannual, annual and quarterly plans of the needs of the computer system for material resources; and rational distribution of equipment and materials among users.

With the traditional methods material and technical supply administrations are not able from a practical standpoint to deal with the fundamentally new tasks which are indispensable to achievement of a substantial rise in the efficiency of material and technical supply. Among these tasks those of programming and optimization are most important.

This gives rise to two basic problems in improving the system of management of material and technical supply of the GUVR of the USSR CSA. The first of them is to automate time-consuming computational operations performed by personnel of subdivisions of the administration's staff in computing indicators. The main thing here is to speed up the arrival, processing and transmission of data. The second problem is related to improving the operational management of the processes of material and technical supply, to distribution of resources and management of deliveries, to raising the level of analysis of adequacy, monitoring, and so on, i.e., to improving the methods of operational management.

Moreover, there are important tasks related to improving the forecasting and multiannual planning of material and technical supply.

It is assumed that these computations will be made and the best (optimum) alternatives explored on the basis of widespread use of the most recent advances in the field of computers, data recording and transmission equipment and the methods of mathematical economics, all combined in the form of computerized management systems.

The material resources supplied by the GUVR of the USSR CSA can be broken down into several large groups: computers for computer stations and MSS, printing and copying equipment, processing equipment, materials, and replacement parts.

The following sets of tasks would be performed for each of these types of resources: forecasting the requirement, distributing allocations, recording availability, recording use of allocations, and analysis of the adequacy of supplies to users.

All these tasks would presumably be performed mainly at the union and republic levels in two stages. In the first stage--setting up the first phase of the subsystem--it would mainly be necessary to prepare the GUVR of the USSR CSA to operate in the context of the functioning of the automated subsystem for management of material and technical supply and to introduce tasks oriented toward freeing managerial personnel from performance of "manual" operations related to calculations, the sorting and transmission of data, punctual delivery of reliable information to managerial personnel on the state of the process of material and technical supply for particularly important supply items.

In view of the need to improve the responsiveness of management at the top level, it would be wise to include in the first phase a set of reference-information tasks that would be performed on request, the results being delivered to visual display units installed in the GUVR of the USSR CSA. The computerized subsystem for management of material and technical supply of the GUVR of the USSR CSA would be designed and introduced on the basis of software developed in the scientific research institutes of the USSR CSA.

The subsystem's further development becomes possible as its fund of information expands, as statistical data accumulate on the entities being managed, and also as experience is gained in performing the tasks in the first phase, which will make it possible to pass on to the second stage of design, i.e., to solving the optimization and forecasting problems of the second phase.

This order in setting up the computerized subsystem for management of material and technical supply of the GUVR of the USSR CSA will make it possible to ensure faster development of computerization of the functions of management in the sections for forecasting and planning the need for material resources, the distribution of allocations, analysis of the adequacy of material resources supplied to users, recording the availability of resources and monitoring the use of allocations.

The computerized management system is always a man--machine system, and its effectiveness depends on the level of interaction of personnel of the administration's staff with the computers and equipment for data collection and transmission. That is why the process of converting to computerization of management is in essence a process of organizing the interaction of the computerized system and the administration's staff. The GUVR of the USSR CSA is being prepared for operation in the context of the functioning of the computerized management system for material and technical supply, including a number of measures, of which the following are some:

i. improvement of the organizational structure of the GUVR of the USSR CSA and distribution of material and technical supply functions among its subdivisions;

ii. optimalization of the data base of the system for management of material and technical supply (standardization of the forms of documents, improvement of document flow, creation of the necessary set of standards and criteria, and so on);

iii. improvement of the methods of planning, recording and regulating material and technical supply;

iv. supplying subdivisions of the GUVR of the USSR CSA equipment for gathering, transmitting, processing and delivering information;

v. training and preparation for operation in the context of computerized management;

vi. adoption of the methods of scientific management.

Thus personnel of the staff of the GUVR of the USSR CSA confronts an important task: to accomplish the necessary preparation of the facility for introduction of the computerized subsystem for management of material and technical supply simultaneously with its participation in preparing the subsystem's design.

Efforts related to the predesign survey of the system to be computerized, to draft and approve the technical assignment for the computerized subsystem for management of material and technical supply, and to selection and installation of the necessary equipment have now been completed. Work is also being done at present on the technical and functional design of the tasks in the system's first phase. In the 1979-1980 period tasks related to monitoring use of allocations (in a breakdown of the oblast, republic) and to fulfillment of delivery plans of supplier plants (for the quarter) are to be delivered for pilot operation. A fund of information is being built up for performance of these tasks; it will include the basic reference manuals of suppliers and users, of computers and processing equipment, of printing and copying equipment, units of measurement, etc.

Once this information is available, it will also be possible to put the reference information system into pilot operation; it is to be make it possible to fill cataloged requests from remote terminals.

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REGIONAL DEVELOPMENT

SCIENTISTS, PLANNERS TARGET NEW SIBERIAN PROJECTS

Building Machines Problems

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 3, Mar 80 pp 32-39

[Article by G. Kurbatova, Sector Chief at the IEiOPP [Institute of Economics and the Department of Industrial Enterprises] of the Siberian Branch of the USSR Academy of Sciences: "Problems in the Development of Machine Building in Siberia"]

[Text] The realization of the program for the accelerated development of the Eastern areas of the USSR is putting forward especial demands upon machine building -- the chief lever of technological progress. Siberia's machine building has the task of reequipping the most important branches of the economy of the eastern areas and of supplying them with modern equipment and systems. Thus, in order to work Siberia's largest mining and coal deposits powerful complexes are needed for stipping as is the transportation equipment, cutting, cleaning, and stacking equipment and other mechanisms of increased unit capacity and productivity which correspond to them.

The need is increasing for especially powerful hydro- and thermal-units and special boilers for thermal electric power stations which are oriented toward the coals of the Kansko-Achinsk basin.

The further exploitation of the petroleum and gas deposits of Western Siberia requires equipment for the simultaneous but separate working of two to three veins and overall mechanized and automated drilling installations. The petroleum and gas areas of Siberia are in need of special (in conformity with the conditions of these areas) transportation equipment: production transportation trailers on air cushions, caterpiller tractors, and others.

Siberian agriculture is experiencing a need for machinery systems which are adapted to work in the natural and climatic conditions of Siberia: rotation plows; cultivators for the thorough cultivation of soils which have been subjected to erosion; and combined multi-function machines and units which make it possible to consistently perform a large number of production operations connected with the cultivation of diverse crops.

It is impossible to ensure the effective working of industrial timber complexes without special machinery systems.

Highly productive equipment is necessary to carry out the large amounts of construction and to increase its efficiency: bulldozers based on industrial caterpillar tractors, drilling and stripping machines, trench excavators, and other production equipment in a Siberian execution. The examples which have been cited testify to the fact that a differentiated approach must be taken to the selection and use of equipment in Siberia.

In addition, in order to provide for the development of the productive forces of this very large region at rapid rates it is necessary to create and organize a specialized production of fundamentally new highly productive machinery and equipment of increased capacity and reliability.

Machine building is not a branch of specialization in the industrial complex of Siberia, but it is one of the profile-setting branches at whose enterprises one-third of the production personnel is concentrated and almost one-fourth of the region's industrial output is produced.

However, the level of the development of Siberia's machine building is still inadequate. One of the important reasons for the slow realizations of the program for the accelerated development of the economy of Siberia and of the other areas of the country's East is the absence of relationships between the machine building branches and the specialized branches of the economy in these areas which are served by them.

The output of the leading machine building plants of the region is oriented basically toward the union marketing zone. As a result of the isolation of the specialization of machine building from the needs and requirements of the Eastern zone, unevenness in the development of its individual branches, and the insufficiently overall nature of machine building output the volume of its importation into the areas of Siberia is practically equal to the volume of exports. The principles of the siting of socialist production provide for interregional relations; however, it is hardly correct to produce machinery and equipment in areas which are experiencing an acute deficit of labor resources in order to export the vast majority of it (90 to 100 percent for certain products) to areas with a more favorable labor resources balance, and, moreover, to cover almost four-fifths of local needs on the basis of importing equipment from other regions (in addition, the imported output does not always correspond to the conditions of its use). Thus, approximately 85 percent of the needs of Eastern Siberia for machine building output is met through imports, while the figure for Western Siberia is 73 percent.[1]

The following are imported into Siberia from other areas (primarily Western areas): metal intensive, large dimension, and difficult to transport equipment and machinery; metallurgical, energy, petroleum, and chemical equipment, trucks, wheeled tractors, tractor sowers, grain cleaning machines, silage harvesting combines, equipment for animal husbandry barns, and so forth.

The lack of correspondence between the item specialization of Siberia's machine building industry and the profile of the economy of the Eastern zone has its history -- a situation which developed during the Great Patriotic War has had its effect. But later also when the issues of the specialization and siting of machine building plants were decided upon consideration was given first of all to the necessity of satisfying union needs without regard to the amount of consumption of various types of machinery and equipment in the areas of the East, and also other factors which have an important influence on the structure of the region's machine building complex and on the very process of its development.

The Economic Efficiency of Siting the Machine Building Industry in Siberia

Siberia's machine building complex is in the stage of formation. It still does not possess a sufficient set of branches to ensure a purposeful combination of diverse forms of technological and parts specialization and a widely developed system of cooperative relations which gives rise to smaller social costs for production. Increased expenditures for the production of individual types of output and also the high capital intensiveness of construction have now become one of the chief reasons for the slower rates of moving machine building into the Eastern areas. The increased expenditures for the production in Siberia of homogeneous machine building products are the result chiefly of intra-branch factors, namely, lower levels of equipment supply for its machine building plants compared to the Western areas; the mastery of the production of output at some of them, the organization of production and labor, and so forth.

The increased expenditures for wages and the corresponding increased expenditure for capital construction in Siberia which are connected with this are not only the result of specific natural and climatic conditions. They also spring from the lower capital-labor ratio, energy-labor ratio, and electricity-labor ratio and the lower level of the mechanization and automation of production processes in the machine building of Siberia, and other factors.

Siberia is already one of the areas with a relatively high density of the consumption of machine building output. As a large metallurgical base is formed here, and as electric energy and the mining, petroleum, and chemical industries, and agriculture and transportation develop here, and as the BAM zone is economically developed there will be an increase in the demand for the metal intensive and electricity intensive output of machine building. In addition, the absolute amounts of consumption by many branches will make it expedient to create here enterprises of optimal capacity, which will increase the economic efficiency of production and make it possible to curtail losses connected with the delivery to the eastern areas of machinery and equipment of the western areas of the country, and also with the use of equipment which does not correspond to the conditions of its work.

It should be noted that at present when the effectiveness of siting machine building in the eastern areas is determined consideration is not given to and correspondingly an evaluation is not made of the conditions of machine use, the factors in the operation of machinery and equipment in these areas. The following is not taken into account: the expenditure losses due to the poorly adapted nature of the machinery and equipment to the local conditions of their operation; higher than the average levels of stocks (insurance reserves) of machine building output; a high level of repair work; an increase in the fixed capital of a machine building profile and its inefficient use in non-machine building branches, and so forth. The underestimation of these factors leads to making insufficiently valid decisions on siting machine building productions over the territory of the country.

A broad national economic approach which takes account of the complex of social and economic tasks is needed in order to solve the problem of the effectiveness of siting the machine building industry over the territory of the country.

The economic expediency of siting the machine building industry in the eastern areas is confirmed by studies which have been performed by a number of scientific organizations (Institute of Economics of the USSR Academy of Sciences, Institute of Economics and the Department of Industrial Enterprises of the Siberian Branch of the USSR Academy of Sciences, the Council for the Study of Productive resources at Gosplan USSR, and the Scientific Research Institute of Economics and Mathematical Economic Methods of Planning at Gosplan of the Belorussian SSR).[2]

The calculations of the relative effectiveness of siting enterprises from various branches of machine building by the economic areas of the country which have been performed by these organizations show, for example, that the siting of many machine building productions in Siberia and, first of all, in Western Siberia, is more effective than in the Urals and insignificantly (2 to 6 percent) less effective (for certain branches, especially metal intensive ones, equally effective) than in the central areas of the European part of the USSR.

The effectiveness of siting machine building in Siberia is to a substantial measure connected with the solution of social problems and, above all, with the necessity for equalizing the development levels of individual areas.

The eastern areas, particularly Siberia and the Far East, are experiencing a deficit of labor resources. For this reason, the basic national economic task consists in a constant increase in the size of the population of these areas and the reduction of migration from them to a minimum. In this respect, the siting of machine building in the areas of the East helps to make labor resources permanent and prevents their migration to other areas of the country.

However, the development solely of the extracting branches which are characterized by relatively high indicators of capital intensiveness and labor intensiveness and by the large-scale construction of basic and auxiliary objects which require substantial initial investments and long mastery periods provide little help in solving the important problems of making cadres permanent and raising the economic level of the areas.

Siberia is in many cases characterized by the territorial disunity of the extracting and processing industries. For this reason, a clear differentiation of Siberia's regional differences with respect to a rational relationship between the individual branches of the economy which provides for a minimum development of machine building in the northern areas and a strengthening of its economic potential in the industrial territorial-production complexes of the south of Siberia could, in the future, create favorable preconditions for a more rapid development of the natural resources of the entire eastern zone of the country.

The Formation of Territorial-Production Complexes in Siberia

As has been said above, Siberia possesses all of the necessary conditions for the formation of a large machine building complex capable of playing an important role in the development of the productive forces of the eastern areas of the USSR.

An analysis of the tendencies toward change in the basic indicators and proportions in the development of consumer branches of machinery and equipment and of their own machine building, and also calculations of the relative effectiveness of siting its various branches among the country's economic areas shows that in Siberia it is rational to develop and site above all the following groups of branches:

heavy machine building -- energy, transportation and hoisting, and road construction equipment and the production of equipment for the metallurgical and mining industries;

the electricl engineering industry;

tractor and agricultural machine building;

individual productions of petroleum and chemical machine building.

The following composition and siting of the basic machine building complexes and their centers on the territory of Siberia may be proposed as one of the possible variants.

The heavy machine building complex. Equipment for the metallurgical and mining industries occupies the largest proportion in the consumption of heavy machine building output in Siberia. At the same time, Siberia's proportion in the production of this group of equipment comes to less than 10 percent of the total USSR production. The need of the area for equipment for the coal industry is met by approximately one-third on the basis of its own production.

The growth of the mining of minerals in the future will require supplying the mining enterprises of Siberia with highly productive reliable equipment which is adapted to a maximum degree to local conditions. As the calculations of specialists show, as a result of the presumed expansion of coal and ore mining the need for the basic types of mining equipment will increase by four to six times, and the transportation of this equipment to the East will increase its cost by more than 10 to 20 percent. In addition, Siberia frequently receives equipment which does not correspond to the local geological mining and climatic conditions.

All of this testifies to the expediency of creating a heavy machine building complex in Siberia on the basis of the expansion and reconstruction of operating mining equipment plants and bringing them close in their item specialization to the needs of the eastern areas and on the basis of the high-power excavator plant being built in Krasnoyarsk and the metallurgical equipment plant being built in Kemerovskaya Oblast.

Hoisting and transportation equipment plays an important role in the development of the overall mechanization and automation of production processes in industry and construction. The necessity for ensuring the planned development rates for the productive forces of the eastern areas in the face of a strained labor balance which is much more acute than in the areas of the eastern part of the country raises the question of a sharp rise in the level of the mechanization and automation of production processes.

Preliminary calculations make it possible to suppose that the average annual growth rates of the production of hoisting and transportation equipment in Siberia during the next 15 to 20 years should be no lower than 11 to 12 percent. It would be advisable for this purpose to create a complex of enterprises of hoisting and transportation machine building here.

The production specialization of the eastern areas is to a substantial extent determined by the level of the development of power engineering. Around 80 percent of the proven stocks of mineral fuel are concentrated in these areas.

The existing level of the development of energy machine building in Siberia does not correspond to the tasks facing it.

Almost 60 percent of Siberia's need for equipment for power engineering is covered through imports from the western areas of the country, which leads to large transportation expenditures. According to the calculations of specialists, the expenditures for shipping one ton of pipe building output as a result of its size and low transportation loading coefficient is four to five times greater than the expenditures for transporting metal (in boiler building five to six times).

The commissioning of power capacities at the thermal electric power stations of Siberia (including the construction of the unique thermal-energy complex of the Kansko-Achinsk State Regional Electric Power Station), Kazakhstan, and Central Asia is giving rise to an increase in the need for energy equipment of apparently three to five times. With such volumes of consumption (optimal for contemporary plants of this type) it is economically efficient to build in Siberia plants for the production of steam turbines and auxiliary boiler equipment, thereby completing the formation of a large energy machine building complex.

It would be advisable to form one branch of this complex in the Altay as a part of the operating plants which are specialized in the production of large-capacity boilers (Barnaul Boiler Plant), the production of medium-capacity boilers (Biysk Boiler Plant), and the new auxiliary boiler equipment plants.

The second branch for the production of large-capacity steam turbines to be used at the thermal electric power stations of the Kansko-Achinsk Basin and of gas turbines for use at thermal electric power stations in accordance with the gas-steam cycle based on coal deposits whose exploitation is planned by the underground coal gasification method could be created in Tomskaya Oblast.

The growing amounts of construction and installation work in industry, transportation, and municipal housing is demanding a sharp increase in the production capacities of road construction machine building plants. Almost one-fifth of all of the construction and installation work is now being performed in the areas of Siberia. In the future, as a result of the accelerated development of the region's productive forces, the amount of construction and installation work will increase by almost four times, which will give rise to an increase in the need for road construction equipment of more than three times. The delivery of such a quantity of machinery will lead to large expenditures, since the expenditures for the transportation of one ton of machinery from the European areas to Siberia come to 20 to 25 rubles. In addition, the importation into Siberia of road construction equipment from the western areas will entail large economic losses connected with the decreased efficiency of its use in the extreme conditions of the Siberian areas.

It would probably be advisable to create in Siberia a construction and road machine building complex consisting of two branch associations:

A Western Siberian association consisting of the operating machinery construction plants -- the Kemerovo, Novosibirsk, and Tyumen' Plants, supplementing them with new enterprises for the production of equipment for plants of ferro-concrete products, volumetric house building, bulldozers, graders, hoisters, loaders, snow cleaners, and minor mechanization equipment for construction and installation work; an Eastern Siberian one consisting of enterprises for the production of excavators, pile-driving equipment, ventilators, heating units, and equipment for the production of shavings slabs and plumbing equipment.

An electrical engineering machine building complex. The mastery of the raw material and energy resources of the eastern areas will bring important changes into the geographical siting of the electrical engineering industry, since the basic development of the generating capacities for the production of electric energy is planned for the east of the country. At the present time more than four-fifths of the output of this branch is produced in the western areas of the country.

According to the calculations of specialists, in the future the share of the eastern areas in the all-union consumption of the basic types of the output of electric machine building will substantially increase. Since there is a general deficit of production capacities for the production of electrical engineering output in the country, and individual types of it are difficult to transport, the necessity is arising for the creation in Siberia of a large complex of electric machine building in the form of two specialized branch associations. The basis for the formation of such a branch exists in Western Siberia. In order to complete it it is necessary to finish the construction and reconstruction of operating enterprises which have already been begun and to build new plants which produce power transformers, high and low voltage equipment, and welded parts and units.

It is planned to create the second large branch of electric machine building enterprises in the Khakassko-Minusinsk Rayon of Krasnoyarskiy Kray. However, to date the problems of the composition of this complex and of its organizational-production forms have not been fully solved, which is making it difficult to plan and carry out further work on its construction.

A tractor and agricultural machine building complex. This complex is of great importance for Siberia: It has the task of supplying agriculture with equipment which corresponds to the zonal requirements of the eastern areas. According to the calculations of specialists, in order to perform agricultural work within the agro-technical periods and to ensure the overall mechanization of agricultural production during the next 15 to 20 years it will be necessary to increase the tractor and agricultural machinery pool in Siberia by 2 to 2.5 times. In addition, the growth of the pool has to be accompanied by an improvement of its structure on the basis of the introduction of a zonal system of machines. In view of the metal intensiveness and the untransportability of the output of this branch and also of the necessity for a close connection between producer plants and the agriculture of the areas, it would be rational to create a complex of productions in Siberia which are in accord with the soil and climatic conditions of the eastern areas and consist of the following four branches:

Altay -- for the production of energy driven caterpillar tractors, wheeled tractors, and soil cultivating and grain processing machines and mechanisms;

Omsk -- For the production of a complex of machines for fertilizer application, of land improvement equipment and of machinery systems for commercial milk farms, and for the mechanization of labor processes in growing vegetables on open ground and in warehouses;

Krasnoyarsk -- for the production of grain harvesting combines and trailers;

Zabaykal'sk -- for the production of harvesting, land improvement, irrigation, and loading and unloading equipment and machinery systems for the mechanization of animal husbandry farms.

A petroleum and chemical machine building complex. The changes in the territorial structure of the extraction of petroleum in the country and the sharp increase in the role of Western Siberia are making necessary corresponding changes in the structure of the territorial siting of the production of petroleum and chemical machine building output. The present location of this branch is characterized by the concentration of almost one-half of the plants in four economic regions -- the Central, Urals, Volga, and Transcaucasus. In Siberia there are only two plants of this branch -- a geological surveying equipment plant and an apparatus and machinery plant in Barnaul. But the products list of their specialization is more oriented toward consumers located in the western areas than toward Siberia and the other eastern areas.

The development of the petroleum and gas deposits of the Western Siberian lowland, the creation of powerful petrochemical and chemical complexes, and the expansion of operating enterprises will greatly increase the need for metal intensive and untransportable equipment. According to the preliminary calculations of branch institutes, the proportion of the eastern zone in the all-union consumption of petrochemical equipment will increase to approximately 35-40 percent. In order to provide for these increased needs it is necessary to create new production capacities in Siberia. And the preservation of the existing situation with the siting of the enterprises of this branch chiefly in the west cannot be regarded as correct, since the delivery of one ton of equipment to the eastern areas costs from 16 to 30 rubles.

This situation is making it necessary to form in Siberia a complex of petrochemical machine building enterprises which are specialized in the production of equipment which corresponds to operational conditions. Provision has to be made within this complex for the production of drilling installations for operation and surveying drilling, drilling and fountain rigging, centrifugal pumps, light-weight drilling installations, and other types of petroleum and chemical equipment.

This kind of complex is characterized by a large metal intensiveness and a relatively small labor intensiveness, and its finished output is distinguished by large dimensions and low transportability. On this basis, it would be expedient to site the enterprises of this complex in Western Siberia on the basis of the metallurgical enterprises of the Kuzbass. Preliminary calculations show that its construction, for example, in Altayskiy Kray which possesses all the necessary conditions for the siting of such machine building complexes could be 1.3-1.4 billion rubles cheaper than in Eastern Siberia.

A complex of plants in the motor vehicle industry. The eastern areas of the country are large consumers of the output of the motor vehicle industry. Yet, with a freight turnover which comes to more than 40 percent of the union volume, the production of trucks for the east of the country (including the Urals) does not exceed 10 percent. In Siberia and in the Far East the motor vehicle industry is represented by a motor vehicle assembly plant in Chita, a truck trailer in Krasnoyarsk, and several small plants which produce tractor equipment and spare parts for trucks.

At the same time, it is supposed that by 1980 the freight turnover of Siberia and the Far East compared to 1970 will increase by 2.3 times, and Siberia's share in the total amount of USSR motor vehicle shipments will come to approximately 18-20 percent.

As a result of poor transportability, the shipment of trucks from the western areas to the east, according to preliminary calculations, may cost 38-50 million rubles for 1980 consumption.

The above factors, and also the specific conditions of the operation of trucks in the eastern areas which have to be considered when they are produced make it expedient to form in Siberia a motor vehicle complex for the production of large-capacity trucks. In addition to the head motor vehicle plant consisting of forging and pressing, assembly, and painting shops, the basic enterprises of this complex have to exist within a large group of related plants for the production of basic parts and units.

Western Siberia (the cities of Kamen'-na-Obi, Kuybyshev, Suzun, Biysk, and others) could become the area for siting the leading plants of the motor vehicle complex. The industrial areas of Krasnoyarskiy Kray can be used for siting truck and tractor trailer plants, semi-trailer and dump truck plants which are adapted to work under the conditions of the eastern areas, and also other related plants.

One of the important ways of increasing the intensification and effectiveness of the development of the machine building industry in Siberia is the creation of specialized interbranch and auxiliary productions. The specialization of interbranch productions as one of the chief reserves for increasing production and labor productivity in machine building is of especial importance for the areas of Siberia with their large deficit of labor resources. However, the most effective directions of the specialization of machine building production in the region at the present time does not meet the tasks of technological progress.

To this day there is not a single specialized plant for the production of billets in Siberia (with the exception of a welded parts and units plant which has already been under construction for more than eight years). The production of this output is scattered over numerous shops in machine building plants.

In Siberia almost all of the parts and units with a general machine building function are produced by the machine building plants themselves. Parts specialization has practically been developed only in tractor and agriculture machine building.

The development of the specialization of the production of general machine building products in Siberia should probably follow the path of the creation of branches for the head enterprises at which the production of homogeneous parts or units with specialized production equipment will be concentrated.

FOOTNOTES

1. V. P. Yevstigneyev, "The Effectiveness of Siting Machine Building in the Eastern and Western Areas of the USSR," Moscow, "Nauka," 1972, p. 80.

2. A. P. Gerko, "The Influence of Regional Conditions on the Formation of the Machine Building Complex of a Large Economic Region (Based on the Example of Western Siberia)," in the book: "Problems in the Methodology of Studying the Siting of Production," Moscow, Council on the Development of the Productive Forces, 1967; V. P. Yevepigneyev, ibid; Yu. K. Kozlov, "The Development and Siting of USSR Machine Building," Moscow, "Machine Building," 1974; G. Ya. Kurbatova, "Machine Building and Metal Working," Chapter 9 in the book: "The Development of the Economy of Siberia," Novosibirsk "Nauka," 1978.

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Accelerated Development of Siberia's Productive Forces

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 3,Mar 80 pp 120-125

[Article: "The Accelerated Development of the Productive Forces of Siberia -- A Very Important Economic Task"]

[Text] As has already been reported in the second issue of PLANOVOYE KHOZYZYSTVO, in December of last year there was an expanded conference of Gosplan USSR at which the very important problems of developing the productive forces of Siberia and of the accelerated introduction of the scientific development work of the Siberian Branch of the USSR Academy of Sciences were discussed.

In his report the Chairman of Gosplan RSFSR N. I. Maslennikov gave an analysis of the growth rates of industry in the eastern areas, of the transportation problems connected with increasing the length of rail and motor vehicle roads, waterways, and petroleum and gas pipelines, and also of the state of labor resources and of the problems of the infrastructure. According to preliminary calculations, in this region gross industrial output will increase more rapidly than in the RSFSR as a whole. The basic direction of the development of the industrial production of group "A" of the eastern areas is an increased role for the fuel and energy, timber, and machine building complexes.

By 1990 it is planned to substantially increase the extraction of petroleum, gas, and coal and the production of electric energy, chemical fibers, cellulose, and so forth. It is planned to obtain the entire increase in the extraction of petroleum, gas, and coal which is scheduled in the republic for the forthcoming decade on the basis of the eastern areas.

For the period until 1990 it is useful to single out three priority regions: Western Siberia consisting of two territorial-production complexes -- the Kuzbass and Northwest Siberia; the Angaro-Yenisey region which includes three territorial-production complexes -- the Bratsk-Ust'-Ilimsk, the Sayansk, and the KATEK; and the BAM zone together with the South Yakutsk territorial-production complex. Within the West Siberian petroleum and gas complex large all-union power engineering bases based on natural gas and unique in their capacities and gas and chemical combines for the production of methanol, amonia, other chemical products, and vitamin protein preparations will be created.

In the Bratsk-Ust'-Ilimsk territorial-production complex it is planned to expand the iron ore industry and the overall processing of timber and also to create a support base for the development of the territories which adjoin this territorial-production complex from the north. In the Sayansk territorial-production complex it is necessary to speed up the construction of the complex's basic facilities and to commission aluminum and railroad car construction plants and electrical engineering enterprises.

During the forthcoming decade the foundation will be laid for the long-term development of the Kuybyshev automobile and tractor electrical equipment and carbuerator plant. The creation of a large coal base on the basis of the coking coals in the South Yakutsk territorial-production complex is one of the very important economic problems of development in the BAM zone.

In connection with the planned increase in industrial potential in the eastern areas it will be necessary to perform work to substantially increase the carrying and freight capacities of wide-guage rail lines on the basis of their reconstruction and electrification, to plan the formation of specialized lines basically for shipments of hard coal, to ensure year-round services by maritime transport for the northern areas of Siberia and the Far East and the development of river transport, and to accelerate the construction rates of motor vehicle roads and powerful new petroleum and gas pipeline systems in the directions of the European part of the country, Kazakhstan, and Central Asia.

The accelerated industrial development of the eastern areas will depend to a large extent upon providing punctual supplies of labor resources for the newly developed areas and upon the training of qualified cadres and making them permanent. During the Ninth and Tenth Five-Year Plans the population of Siberia and the Far East grew at more rapid rates than in the European areas of the RSFSR and in the republic as a whole. During the 11th Five-Year Plan the increase in the population of these areas will be much greater than in the European part of the RSFSR; measures to make the labor power which is arriving in Siberia permanent on the basis of an accelerated development of the social infrastructure are becoming very important.

One of the chief problems -- supplying the population with food -- has to be solved through an intensive development of agriculture in the areas of Siberia and the Far East. One-third of the agricultural land and one-fourth of the arable land in the Russian federation is concentrated in these areas. In recent years large changes have taken place in the agriculture of Siberia and the Far East -- the material and technical base has grown stronger and last year the fixed productive capital of the kolkhozes and sovkhozes came to more than 20 billion rubles. In three years of the Tenth Five-Year Plan 20 percent of the republic's agricultural production was obtained in Siberia and the Far East, and in 1978 a gross agricultural output of 11 billion rubles was produced here.

At the same time, the eastern areas are a consuming region. In 1978 a substantial amount of meat and dairy products and of vegetables and melon crops was imported into them from other areas (basically from the western part of the Russian federation).

In evaluating the general situation of agriculture in the eastern areas, N. I. Maslennikov noted that the level and the rates of their development do not correspond to the growing demands of the population and to their potentialities as a result of which it is necessary to provide in the draft plan for the 11th Five-Year Plan and for the period until 1990 measures for a more accelerated development of agricultural production. At the same time, the processing industry, including the food and also the light and textile industries, have to obtain a wide development. Measures should be mapped out for the creation in Siberia and the Far East of a developed complex of the social infrastructure.

The report of Academician G. I. Marchuk generalized the experience connected with studying and developing the natural resources of Siberia. The scientific institutions and centers of the branch are located in Siberia's large cities -- Novosibirsk, Irkutsk, Tomsk, Krasnoyarsk, Yakutsk, Ulan-Ude, Tyumen', Kemerovo, Barnaul, Omsk, Kyzyl, and Chita. More than 100 institutions, organizations, and enterprises with a total of 40,000 workers are a part of the scientific centers and divisions of the branch. The scientists of the Siberian Branch have obtained important scientific results in the theoretical and applied fields of mathematics and mechanics, in nuclear physics and the physics of semiconductors, quantum electronics, the theory and practice of catalysis, the study of combustion and explosion processes, and in biological research on genetics and plant and animal selection. The branch's scientists are taking active part in working out the theoretical principles for discovering the chief types of mineral raw materials. The work of Siberian scientists in theoretical and applied mathematics has laid the basis for the solution of a number of important practical problems, including in the field of hydrodynamics, geophysics, and the physics of the atmosphere and the oceans. Studies in the field of theoretical and experimental physics have led to the creation of equipment for the study of the structure of the nucleus, to the development of unique instruments and stable lazers, and to the development of the integral schemes and elements of electronic equipment; a large cycle of work has been performed in the field of automation. Scientific work in the field of the physics of combustion and explosions, the mechanics of liquids and gasses, and the physics of low temperature plasma and thermal physics has been the basis for new technologies for welding metals and for creating chemical plasma reactors, and products and materials for new equipment. In the field of power engineering the principles have been developed for a theory of large energy systems and for the development prospects of the country's fuel and energy balance. As a result of basic research by chemical institutes effective new catalyzers have been created for industrial processes, highly productive chemical technology equipment, methods for the deep cleaning of precious metals and semiconductor materials, and methods of extracting rare metals. A number of new chemical substances and compounds which are used in many branches of industry and in agriculture have been obtained and studied. The branch's biologists have created new varieties of spring wheat and have obtained sugar beet hybrids with an increased sugar content and pure-bred groups of highly productive sheep. The scientific principles of using and reproducing the forest resourses of western and eastern Siberia have been created, as have methods of fighting against dangerous forest pests. The soil composition over substantial areas of Siberia has been studied.

As a result of a study of the structure of the earth's crust the theoretical principles of discovering the chief types of mineral raw materials and the basic directions for surveying petroleum and gasses in the paleozoic layers of the earth's core in western and eastern Siberia have been worked out, reccomendations have been given on increasing the effectiveness of the discovery of the deposits of diamonds, gold, mineral fertilizers, and ferrous, non-ferrous, rare, and precious metals, and valuable mono crystals have been synthesized for instrument making and for the jewelery industry. Yakutsk scientists have created Siberian siesmic regionalization maps and have provided siesmological engineering evaluations of the Baykal-Amur Mainline tract; overall research has been performed on the surface and underground waters of Siberia and a large cycle of work has been done on the geography and geology of this area; and new methods and equipment have been developed for geophysical studies of the earth's core and for searching for minerals.

Studies in the field of the social sciences are being carried out in close connection with the natural sciences. Mathematical economic models have been created of optimal variants for the siting and developing of the various branches of production and of territorial-production complexes, studies have been conducted on the problems of the economic development of the promising areas of Siberia and the Far East, and studies are being developed on the social problems of developing the Siberian village. In a unique five-volume study, "The History of Siberia," the historic path of the multi-national population of Siberia and its contributions to history and culture are examined; the studies of the Siberian school of archeologists have received wide recognition; and the philosophical problems of natural science and social development are being worked on.

The work of the scientists is being accompanied by close contacts with ministries, departments, scientific institutions, and vuzes. The branch's scientific work has received 3,800 inventors' certificates, 660 patents have been bought by foreign industrially developed countries, 13 license agreements have been concluded with companies from the United States, Japan, and the FRG, and so forth.

In 1977-1978 in all of the oblast and kray centers of Siberia and in the Yakutsk and Buryat autonomous republics aktiv meetings were held at which there was a joint examination with local party and government bodies, enterprise leaders, and the scientific public of the most important problems of the development of each region. As a result, more than 30 scientific programs were formed which were later united into the single long-term overall "Siberia" program. It covers the key problems of the study of the use of the mineral, land, timber, and water resources of the eastern region and of the development of the West Siberian petroleum and gas complex, the Kuzbass, the Kuybyshev automobile and tractor electrical equipment and carbeurator plant, Krasnoyarskiy Kray, the BAM zone, Lake Baykal, the territorial-industrial complexes of the Angaro-Yenisey and other regions, of environmental protection and so forth.

A substantial part of the basic and applied research of the Siberian Branch of the USSR Academy of Sciences will be directed toward the solution of these problems during the 11th and 12th Five-Year Plans. The problems of the fuel and energy complex are being intensively worked upon. Along with the USSR Ministry of the Coal Industry, studies are being made of the problems connected with improving the technology of working the coals of the Kuzbass and the KATEK, which will make it possible to rapidly develop the deposits with minimum expenditures. Methods are being sought for the highly efficient burning of the coals of these basins and also for the overall processing of Kansk-Achinsk coals. Along with the ministries, scientists from the Siberian Branch of the USSR Academy of Sciences have mapped out the ways to develop deposits of new type petroleum and have developed effective vibroseismic methods of surveying petroleum and gas.

Extensive research is being conducted on the problems of developing the Noril'sk Mining and Metalurgical Combine and on creating a complex of new mining machines. Scientists have made an important contribution to study the biological resources of agricultural production and to the creation of new highly productive plant varieties and livestock breeds. Through the joint efforts of biologists and chemists new gibberellin preparations have been synthesized and experimentally tested -- growth regulators which increase the yield of potatoes, tomatoes, and corn by approximately 20 to 40 percent.

Several variants of the economic development of BAM have been examined. The branch has prepared a two-volume scientific volume "The Economic and Social Problems of the Development of the Productive Forces of Siberia for the Period Unitl 1990" in which an analysis and evaluation is given of the raw material base for developing the productive forces of Siberia and the materials of an overall program of scientific and technological progress and its social and economic consequences are presented.

The report by G. I. Marchuk scientifically substantiates development rates for the various branches of the economy of Siberia which are aimed at achieving a maximum national economic effect for the entire country. They have to exceed the average rates of the country as a whole, since without this outstripping the development rates of the country as a whole will be lowered primarily as a result of a shortage of fuel and energy resources. It is also necessary for there to be an accelerated development of housing construction and of the infrastructure in order to solve the most difficult task -- providing labor resources for industry and agriculture.

The Presidium of the USSR Academy of Sciences has adopted a decision to carry out in June 1980 an all-union conference on the development of the

the productive forces of Siberia at which proposals and recommendations on the problem of developing Siberia during the 11th Five-Year Plan and for the long term until 1990-2000 will be examined.

Along with specialists from the branch scientific research institutes, designing bureaus, and industrial and agricultural enterprises, the branch's scientists have developed a systems approach to the problem of introducing the achievements of science whose basis is the Overall Program for long-term cooperation on major future scientific and technical programs. At the present time the Siberian Branch of the USSR Academy of Sciences has concluded long-term program agreements with 22 industrial ministries and departments of union and republic subordination. The scientific research institutes and special designing bureaus of the 8 union ministries and departments located in the area of the Novosibirsk academic town are a connecting link between academic science and the branches of industry.

During the Ninth and Tenth Five-Year Plans major works by the branch received a practical application at the enterprises of many ministries which were given a large amount of scientific development work (the economic effect from their introduction exceeds 2 billion rubles).

Academician A. A. Trofimuk considered the problem of increasing the extraction of petroleum in Western Siberia. The chief task is to sharply increase geological survey work in Siberia and to strengthen the material and technical base of all organizations which are surveying petroleum and gas. Especial attention should be devoted to searches for petroleum in paleozoic deposits from which petroleum is being extracted by industrial methods in Tomskaya Oblast.

Academician L. A. Melent'yef reported on the systems studies in power engineering which are being conducted by the Siberian Energy Institute and the Institute of High Temperatures of the USSR Academy of Sciences.

In the modern scientific understanding of it, power engineering is considered as an aggregate of large systems. The largest of them is the general power engineering system which embraces the basic elements and relationships of the fuel and energy complex. After this there are the well-known functional systems -- electric energy, nuclear energy, a single gas supply system, a petroleum supply system, and others. All of the systems are organized according to a strict energy principle and for this reason the problem of managing them is regarded as a task of managing a hierarchical structure with quite complex properties. During the past period the optimal structure for the fuel and energy complex has undergone a substantial development. In a short period of time a very large gas industry with a single gas supply system and an advanced petroleum and petroleum refining industry have been created in the Soviet Union, and the coal industry and electrification of the country on the basis of a single electric energy system are developing successfully.

At the same time, there is a growing inertia in the development of the fuel and energy complex. In order to change its structure by 3-4 percent, 10 to 15 years are needed. Fuel supplies can be improved for carrying out active measures to economize energy. In addition, it is necessary to more closely coordinate production plans in the branches of the fuel and energy complex with capital investments plans and allocated material resources, to improve the mechanism of the optimal distribution of capital investments in these branches, and to ensure the centralized planning of energy consumption as a very important element of an energy saving policy.

A communication by the Corresponding Member of the USSR Academy of Sciences Ye. I. Shemyakin was devoted to the problems of a further development of the fuel and energy complex of the eastern areas of the country. In his speech the Minister of the Petroleum Industry N. A. Mal'tsev stopped to consider the problems of a further development of the petroleum industry, particularly in Western Siberia. Every year the petroleum workers are putting new deposits into operation. Each of them is characterized by relatively small petroleum stocks which makes for definite difficulties. The dimensions of drilling work are decisive in the development of the petroleum industry. In 1980 in order to achieve the planned amount of petroleum extraction it will be necessary to increase the amount of drilling work by 1.5 times.

The minister agreed with the statement of Academician A. A. Trofimuk that the amounts of surveyed drilling in Western Siberia are inadequate and in this respect urgent measures will have to be taken during the new five-year plan to strengthen the material and technical base of geological surveying organizations. At the same time, work rates in Western Siberia are being held back by the poor development of transportation communications, including hard-top automobile roads.

Academician D. K. Belyayev described the work by biologists on the theory of animal and plant heredity. As a result of the development of a theory of nontraditional methods of controlling hereditary changes in plant organisms a large number of promising varieties of agricultural crops have been created, some of which are already being widely used in the economy. One may cite as an example the well-known radiation variety of spring wheat "Novosibirskaya-77" which has been regionalized in Western Siberia.

The scientist described work on using growth preparations -- gibberellins. This preparation is being produced in small quantities in our country, which is holding back its extensive introduction. The work of Siberian scientists on regulating the conditions for the fertility of swine gave rise to great interest.

Academician G. K. Boreskov reported on work in the field of the development of chemical and petroleum refining industries in Siberia. Research which has been performed has established the great importance of catalysis for burning fuel; torch furnaces are usually used for these purposes (they are very cumbersome and their heat use coefficient does not exceed 40 percent).

Academician A. L. Yanshin devoted his report to the problems of developing agriculture in Siberia. At the present time 32 million hectares are being sown in Siberia and of them 27 million hectares are being sown with grain crops, chiefly wheat. But due to the insufficient application of fertilizers their average yield comes to 11-12 centners per hectare. This is substantially less than in Estonia which is located approximately in the same climatic zone as Siberia. Siberia's soils are poorest in phosphorus and for this reason it is most effective to use phosphate fertilizers. It is irrational to import them from the European part of the USSR, and it is necessary to build Siberia's own enterprises. It is necessary to accelerate the construction of the Zabaykal Apatite Plant with an annual capacity of 1.5 million tons of apatite concentrates on the basis of the Khubsugul' phosphate-bearing basin. According to preliminary calculations, the cost of one ton of concentrate will come to 16-17 rubles, which is much less than in the Zabaykal'ye or in Yakutiya. As a result of long years of searching geologists have discovered deposits of potassium salts which are extremely necessary to agriculture.

Academician A. G. Aganbegyan devoted his address to the problems of siting the productive forces in the eastern areas and to the problems of economic efficiency. The well-known principle that the construction of facilities which require large amounts of fuel and energy should be limited in the European part of the country and in the Urals, while they should be sped up in Siberia is not yet being carried out satisfactorily.

The construction of energy intensive enterprises in Siberia has to be increased. However, it has to be taken into account that a construction base has not yet been created here and that there is a shortage of labor resources. Some enterprises should be sited only in Siberia. For example, in Krasnoyarskiy Kray where there is a lot of timber wastes it is expedient to build cellulose and paper and hydrolysis enterprises. In order to ensure the efficiency of industrial production in Siberia a regional technical policy should be carried out and planned indicators of fuel, energy, and labor intensiveness should be introduced.

The President of the USSR Academy of Sciences Academician A. P. Aleksandrov called the attention of the participants in the Gosplan USSR conference to certain problems of Siberia, particularly the problem of the development of agriculture. Do zone areas need to be expanded? I think that the proposal by Acadmician A. L. Yanskin on increasing the intensification of the development of cropping and increasing yields through the wide use of fertilizers should be adopted. For example, in Belorussia which previously had the lowest yields in the country, the average yields of grain crops now come to 27.6 centners per hectare. The climatic conditions of Siberia (the zone of the basic zone areas) are similar to those of Belorussia and even somewhat more favorable. For this reason, the task of Gosplan USSR is to select an auspicious way of developing Siberian agriculture. The USSR Academy of Sciences and its Siberian Branch will provide the necessary help in this important matter.

Siberia possesses all of the conditions for the creation on the basis of its agriculture of a sufficiently balanced feed base for livestock. We know that feeds are still short in protein, although, for example, a large amount of vegetable protein can be obtained in Krasnoyarskiy Kray and Amurskaya Oblast. In addition, wide use can be made of stocks of natural gas and petroleum and of various types and varieties of timber in order to obtain microbiological proteins.

The address touched upon questions connected with the development of power engineering and called attention to the necessity for a sharp increase in the amount of geological surveying work to discover petroleum and gas in Siberia and for an acceleration of a direct current electric transmission line.

Academician A. N. Skrinskiy reported on work in the field of using radiation technology in the economy. This involves the widely used technology of irradiating polymer materials in order to increase their heat resistance and strength. Work is now being performed on using new methods to destroy barn pests which attack grain in storage and to disinfect the waste waters of animal husbandry complexes and chemical enterprises and the municipal sewage of cities. However, despite their substantial effect, these methods are not yet being used sufficiently widely. The attention of Gosplan USSR and of the ministries and departments has to be attracted to these important problems.

The Corresponding Member of the USSR Academy of Sciences T. I. Zaslavskaya described the work of Siberian scientists in the field of economic and social problems. Social factors determine to a substantial extent the processes of the economic development of Siberia. Concern is being caused by labor turnover which is approximately twice as high as turnover which is caused by production mobility and increased worker qualifications. The chief reason is a lack of supply of housing and unsatisfactory supplies of industrial and food goods.

Scientists from the Siberian Branch and from the All-Union Academy of Agricultural Sciences imeni Lenin have developed a system of measures to solve the social problems of Siberia. It is believed that there is a possibility in the 11th Five-Year Plan to bring the standard of living in Siberia close to that of other areas of the country, and in the 12th Five-Year Plan to create preferential living conditions for Siberians. In accomplishing this task it is necessary to review the capital investment distribution proportions for the production and non-production sphere and to bring housing supplies in Siberia up to the average republic level during the 11th Five-Year Plan. A special kprogram for the development of health care has to be realized in Siberia.

The Corresponding Member of the USSR Academy of Sciences N. V. Cherskiy described the work of the Yakutsk division of the Siberian Branch of the USSR Academy of Sciences in the field of ensuring the reliability and service life of the equipment and structures which are operated under low temperatures. The annual losses as the result of the use in the North of series produced motor vehicles which are not adapted to the severe conditions come to hundreds of millions of rubles. According to the research data of the Institute of the Physical and Technical Problems of the North, at low temperatures there are frequent accidents at pipelines and the destruction of fragile welded structures and large reservoirs and vessels. There is now an acute necessity to organize their series production from special materials.

Calculations show that the realization of the measures proposed by the Yakutsk division will make it possible as early as three to four years from now to obtain an economy of direct expenditures based on extending the service life of motor vehicles in the northern areas of 350-400 million rubles a year, and the same kind of economy based on improving the operations of production and other enterprises and organizations.

The problems of training and making efficient use of research cadres found a reflection in the report of Academician of V. A. Kopdyug. The training of cadres is an important part of the social and economic development of Siberia. The higher educational system has to be reorganized in such a way that it meets the demands not only of the present day, but also of the future. The most promising direction in the organization of the system of teaching in higher education is a shift to active forms of education which are widely used at Novosibrisk University.

The development of active forms of education and a maximum development of the creative capacities of students -- this is the lever which will make it possible to greatly increase the effectiveness of the training of specialists in the higher educational system.

Corresponding Member of the USSR Academy of Sciences A. S. Alekseyev described research in the field of creating a method of volumetric dynamic seismic surveying for complex geological structures. With the assitance of the USSR Ministry of Geology and USSR Ministry of the Petroleum Industry, a model is being created in the Siberian Branch of a production system for organizing the work of seismic surveying according to this method which includes fluctuation sources of the explosion type or of the type which has been restructured into vibration sources of longitudinal and transverse waves. An explosion type vibrator has been created and is undergoing tests. A model has been manufactured of a multi-channel digital seismic station (with 500 channels) with subsequent digital inquiry and a small number of conducting lines, or with the help of an ultra shortwave conveyor. Such stations make it much easier to organize multi-element area observation systems and eliminate the use of heavy equipment and special swathes in forest areas. A field computer complex for collecting, processing, and telemetrically transmitting data has been created -- a mobile all-purpose computer of quite high productivity with a developed periphery based on standard microcomputers.

Corresponding Member of the USSR Academy of Sciences A. S. Isayev reported on the possibilities of using aerospace methods in studying Siberia's natural resources. The use of aerospace photos makes it possible on an ecological landscape basis to present a natural interpretation of a territory, to divide it into complexes, and within them to organize a scheme for the regionalization of Siberia's forests.
At the conclusion of the conference the Chairman of Gosplan USSR N. K. Baybakov spoke. He took note of the great importance of the questions which had been discussed which are connected with the development of the country's economy, primarily through the development of the productive forces of Siberia and the Far East. In the country's east it is necessary to ensure the development above all of raw material and fuel resources and to place them at the service of the economy.

The reports by N. I. Maslennikov and G. I. Marchuk and the addresses by the scientists raised many problems which have to be solved. The division heads of Gosplan USSR have to study them carefully and take them into account in developing a new five-year plan and the prospects until 1990. Similar work has to be done by the scientific research institutes at Gosplan USSR.

Without the wide introduction of scientific achievements and without an increase in the efficiency of public production it will be diffict to solve the problems of the further social and economic development of the country. It is not an accident that the report by the Siberian Branch of the USSR Academy of Sciences has been placed on the table for a discussion by an expanded conference of Gosplan USSR. We are concerned with providing to a maximum extent in the draft plans for major measures to introduce into the economy such scientific and technical achievements as, for example, the use of radiation technology, gibberellins, new types of catylizers, and improved methods of surveying petroleum, gas, and other minerals, and so forth. Concrete proposals will have to be prepared on the extensive introduction of the major scientific work of the Siberian Branch of the USSR Academy of Sciences. At the same time, we have to provide comprehensive help to the scientists in strengthening the experimental and material base of the institutes of the Scientific Branch.

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REGIONAL DEVELOPMENT

INSTRUCTIONS FOR DRAFTING REGIONAL DEVELOPMENT PROGRAMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 80 p 6

[Text] Methods Instructions on Developing Target Comprehensive Programs to Solve Regional Problems and to Shape and Develop Territorial-Production Complexes, as approved by the USSR Gosplan on 31 January 1980.

I. General Provisions

1. Programs to solve regional problems, shape and develop territorial-production complexes, are a species of target comprehensive national economic programs and are developed as a most important component of state long-range economic and social development plans. Territorial programs are aimed at ensuring the comprehensive economic utilization of new territories or the transformation of existing regions, at shaping and developing territorial-production complexes (TPK's) associated with the participation of several branches of the national economy. Each territorial program is strictly target in nature, is a directive, address document which defines a system of assignments and measures coordinated in terms of resources, executors and implementation schedules and ensuring a concentration of effort and funds to attain the end results planned.

2. The territorial program must define:

the overall goal and subgoals of the program and schedules for implementing them;

the territorial composition of the program;

a list of branches, ministries, departments, associations, enterprises and organizations, indicating the nature and extent of the ties among them;

the interaction among production facilities and branches within the region (TPK);

the total amount of resources needed to carry out the program, delineating that portion to be provided within the region (TPK) itself;

assignments for the ministries, departments, associations, enterprises and organizations participating in implementing the program, regardless of the region in which they are located, and corresponding measures;

the forms and methods of program actualization planning and management.

3. Depending on the scope of the tasks being solved, territorial programs can be of statewide or republic importance.

Territorial programs of statewide importance are developed under the leadership of the USSR Gosplan (client) and are an integral part of state plans for USSR economic and social development.

Territorial programs of republic importance are developed under the leadership of the union republic Councils of Ministers (clients -- union republic gosplans) and are included in the state economic and social development plans of the union republics.

4. Territorial programs are subdivided into the following programs based on the nature of the problems being solved:
utilization of new territory;
transforming the economy of developed regions;
shaping and developing territorial-production complexes;
solving individual problems on a particular territory (economic, social, infrastructure development, and so forth).

The indicated types of programs predetermine the features of methods instructions on their development.

5. Territorial programs are drawn up for the entire period needed to actualize the goals set, delineating planning periods and the basic stages in which the program is to be implemented.

6. The system of territorial program indicators is based on a unified system of state economic and social development plan indicators.

7. When substantiating the assignments of a territorial program, the principles and methods of national economic planning put forth in USSR Gosplan Methods Instructions for Developing State Plans of USSR Economic and Social Development are used. Calculations are made using consolidated norms and normatives used in long-range planning, as well as norms and normatives developed especially for a specific program.

II. Structure of Territorial Programs

8. The structure of territorial programs is determined as a function of their goals. Each program must include the following main sections:
target, containing a formulation of the problem, primary goal, subgoals and tasks of the program, including a required description of the initial level of the status of the problem, end results and schedules for solving it;
summary, containing the system of basic program indicators, including amounts of different types of resources needed to carry out the program and the indicators of its effectiveness;
branch, containing a complete list of assignments for USSR ministries

and departments and union republic Councils of Ministers and the limits on different types of resources being allocated to carry out these assignments;

territorial, containing a complete list of assignments for union republic Councils of Ministers on ensuring comprehensive economic and social development on the territory in which the the program is being implemented;

organizational, defining the forms, methods and procedure for administering and organizing execution of the program and monitoring its implementation, as well as the organizational-economic measures required.

Program sections must contain the necessary substantiation and explanations. Program development must be done in several variants distinguished from one another by the ways, means, periods and effectiveness of attaining the goals set.

9. Along with solving the main target tasks, a territorial program must anticipate:

development of the production infrastructure (the construction and power base, transport, and so on);

development of the social infrastructure (housing, children's institutions, schools, sociocultural facilities, medical institutions, and so on);

effective use of labor and material resources;

efficient use of natural resources and protection of the environment;

territorial organization of the economy and settlement.

The territorial program must ensure the coordination of production facilities and the synchronous start-up of facilities linked to one another, optimum proportions in development of production and the production and social infrastructure, amounts of capital construction and construction base capacities, as well as the prompt preparation of estimate-planning documentation.

10. Depending on the program subgoals outlined, subprograms are to be delineated, each of which can contain sections and problems indicated in sections 8 and 9 of these Methods Instructions.

III. Procedure for Developing Territorial Programs

11. Territorial programs are developed in stages. Initially, the most important territorial problems subject to programmed solution are selected and a list of the territorial programs planned for development in the forthcoming planning period is approved not later than a year and a half prior to the start of the next five-year plan; the client and lead developer are indicated at this time. This work is done by the USSR Gosplan, with the participation of USSR ministries and departments and union republic Councils of Ministers, and is based on preprogram developments (regional productive forces development and distribution plans, plans for shaping territorial-production complexes, and others) carried out under scientific research and planning-surveying plans.

Preprogram scientific developments must determine by comparing variants the basic parameters of development of the most important branches in the region

(TPK), the list and distribution of the largest production facilities, approximate amounts of sociocultural construction, the main directions in which the system of population centers is to be shaped and developed, as well as approximate capital investments and labor resources requirements.

12. Based on an approved list of programs, the client organization (or, at its direction, the lead developer) prepares and issues a starting assignment for developing a territorial program; it must contain:

an expanded formulation of the primary goal, main subgoals and tasks of the program, with quantitatively defined final indicators;

the approximate territorial composition of the program;

an approximate composition of the branches and types of production participating in actualizing the program;

expenditures on developing the program, indicating the source and procedure of financing;

instructions on organizing the development, on approving and reviewing the program.

13. The lead developer, governed by the starting assignment, prepares and coordinates with the client:

an overall plan for the program and the organizational plan for drawing it up;

a coordination plan in which the content, procedure and schedules for completing jobs and the amounts and sources of their financing are defined for all those performing the work;

the necessary methods materials, forms and indicators for those performing the work.

The lead developer exercises organizational and scientific-methods leadership of the activity of all those performing work, those responsible for preparing individual subprograms; it prepares a draft territorial program in summary form and submits it to the client.

14. The client continuously monitors the course of developing the draft territorial program and, when necessary, can adjust individual provisions of the starting assignment. After receiving the draft territorial program, the client, with the involvement of the organizations concerned, sets up its review and approval. The most important territorial programs of statewide importance are approved by the USSR Council of Ministers or USSR Gosplan.

15. After approval of the territorial program, the appropriate assignments are communicated to the USSR ministries and departments and the union republic Councils of Ministers participating in its actualization, and that part of the program relating to the next planning period is included in the state plans for USSR and union republic economic and social development, as well as in the plans of the corresponding USSR ministries and departments.

These Methods Instructions put forth the general provisions on developing target comprehensive territorial programs and are the basis on which the clients (or, at their direction, the lead developers) must work out methods instructions for developing each specific territorial program.

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